

CLAIMS:

1. A process for producing ethanol, comprising the step of treating distillers' grains with a fatty acid oxidizing enzyme.
- 5 2. The process of claim 1, wherein the distillers' grains are further subject to a chemical treatment and/or a mechanical treatment.
3. The process of claim 1, wherein the distillers' grains are further subject to a chemical
10 treatment and/or a mechanical treatment prior to the treatment with a fatty acid oxidizing enzyme.
4. The process of claim 2 or 3, wherein the chemical treatment comprises treating the distillers' grains with a mild acid.
- 15 5. The process of claim 2 or 3, wherein the mechanical treatment comprises treating the distillers' grains with a high temperature and a high pressure.
6. The process of any of the preceding claims, wherein starch is recovered from the
20 treated distiller's grains.
7. The process of claim 6, wherein the starch recovered is treated with a starch degrading enzyme, esterase and/or hemicellulase or cellulase and fed into a liquefaction, saccharification and/or fermentation process.
- 25 8. The process of any of the preceding claims, wherein the starch is recovered and treated with a raw starch degrading enzyme and fed into a liquefaction, saccharification and/or fermentation process.
- 30 9. The process of any of the preceding claims, wherein the recovered starch is treated with one or more enzymes selected from the group consisting of alpha-amylase, in particular acid alpha-amylases, CGTase, glucoamylase, maltogenic amylase, beta-amylase and fed into a liquefaction, saccharification and/or fermentation process.

10. The process of any of the preceding claims, wherein the recovered starch is treated with a hemicellulase or cellulase and fed into a liquefaction, saccharification and/or fermentation process.

11. The process of any of the preceding claims, wherein the recovered starch is treated with an esterase, preferably a lipolytic enzyme, such as a lipase or phospholipase and fed into a liquefaction, saccharification or fermentation process.

12. The process of any of the preceding claims, wherein the recovered starch is treated with a glucoamylase and a fungal acid alpha-amylase and wherein said treated starch is fed into a liquefaction, saccharification and/or fermentation process.

13. The process of claim 1, wherein the distiller's grain are further treated with an enzyme selected from the group consisting of a maltogenic alpha-amylase, and an esterase, in particular a lipolytic enzyme, preferably a lipases or phospholipases.

14. The process of any of the preceding claims, wherein non-starch material, in particular protein, is recovered from the treated distiller's grains.

15. The process of claim 14, comprises treating the recovered protein with a protease and wherein said protease treated protein is fed into a liquefaction, saccharification and/or fermentation process.

16. The process of claim 14, wherein the protein is fed into a liquefaction process.

17. The process of claim 14, wherein the protease treated protein is fed into a simultaneous saccharification and fermentation process (SSF) or simultaneous liquefaction, saccharification and fermentation process.

18. The process of any of the preceding claims, wherein the distillers' grains are distillers' dried grains.

19. The process of any of the preceding claims, wherein the distillers' grains are distillers' dried grain with solubles.

20. The process of any of the preceding claims, wherein the distillers' grains are distillers' wet grains.

21. A process for producing ethanol, comprising:

5 (a) pre-treating distillers' grains with a chemical treatment and/or a mechanical treatment to release starch and protein present in distillers' grains;

(b) treating the chemically and/or mechanically treated distillers' grains with a fatty acid oxidizing enzyme;

(c) treating released starch with a starch degrading enzyme; and

10 (d) feeding the treated starch into a liquefaction, saccharification and/or fermentation to produce ethanol.

22. A process for producing ethanol, comprising:

15 (a) pre-treating distillers' grains with a chemical treatment and/or a mechanical treatment to release starch and protein present in distillers' grain;

(b) treating the chemically and/or mechanically treated distillers' grains with a fatty acid oxidizing enzyme;

(c) treating released protein with a protease; and

20 (d) feeding the treated protein into a liquefaction, saccharification and/or fermentation to produce ethanol.

23. The process of claim 22, wherein the chemical treatment comprises treating the distillers' grains with a mild acid.

24. The process of claim 21 or 22, wherein the mechanical treatment comprises treating the distillers' grains with a high temperature and a high pressure.

25. The process of claim 21 or 22, wherein the starch recovered is treated with a starch degrading enzyme, esterase and/or hemicellulase or cellulase and fed into a liquefaction, saccharification and/or fermentation process.

26. The process of any of the preceding claims, wherein the starch is recovered and treated with a raw starch degrading enzyme and fed into a liquefaction, saccharification and/or fermentation process.

27. The process of any of the preceding claims, wherein the recovered starch is treated with one or more enzymes selected from the group consisting of alpha-amylase, in particular acid alpha-amylases, CGTase, glucoamylase, maltogenic amylase, beta-amylase and fed into a liquefaction, saccharification and/or fermentation process.

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28. The process of any of the preceding claims, wherein the recovered starch is treated with a hemicellulase or cellulase and fed into a liquefaction, saccharification and/or fermentation process.

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29. The process of any of the preceding claims, wherein the recovered starch is treated with an esterase, preferably a lipolytic enzyme, such as a lipase or phospholipase and fed into a liquefaction, saccharification and/or fermentation process.

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30. The process of any of the preceding claims, wherein the recovered starch is treated with a glucoamylase and a fungal acid alpha-amylase and said treated starch is fed into a liquefaction, saccharification and/or fermentation process.

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31. The process of claim 21 or 22, wherein the distiller's grains are further treated with an enzyme selected from the group consisting of a maltogenic alpha-amylase and an esterase, in particular a lipolytic enzyme, preferably a lipases or phospholipases.

32. The process of any of the proceeding claims, wherein non-starch material, in particular protein, is recovered from the treated distiller's grains.

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33. The process of claim 32, wherein comprises treating the recovered protein with a protease and said protease treated protein is fed into a liquefaction, saccharification and/or fermentation process.

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34. The process of claim 33, wherein the protease treated protein is fed into a simultaneous saccharification and fermentation process (SSF) or simultaneous liquefaction, saccharification and fermentation process.

35. The process of any of the preceding claims, wherein the distillers' grains are distillers' dried grains.

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36. The process of any of the preceding claims, wherein the distillers' grains are distillers' dried grains with solubles.

37. The process of any of the preceding claims, wherein the distillers' grains are distillers' wet grains.

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